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A.D. 1855 . . . . . N<sup>o</sup> 1849.

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S P E C I F I C A T I O N

OF

GEORGE NAPIER.

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FURNACES.

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LONDON:

PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,

PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY:

PUBLISHED AT THE GREAT SEAL PATENT OFFICE,

25, SOUTHAMPTON BUILDINGS, HOLBORN.

Price 3d.

1856.







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A.D. 1855 . . . . . N° 1849.

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**Furnaces.**

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*(This Invention received Provisional Protection, but notice to proceed with the application for Letters Patent was not given within the time prescribed by the Act.)*

**PROVISIONAL SPECIFICATION** left by George Napier at the Office of the Commissioners of Patents, with his Petition, on the 15th August 1855.

I, GEORGE NAPIER, of Renfrew Street, Glasgow, in the County of Lanark,  
5 and of Adelphi, London, in the County of Middlesex, Engineer, do hereby declare the nature of the said Invention for “**CONSTRUCTING FURNACES FOR MARINE AND OTHER BOILERS AS WELL AS FOR OTHER FURNACES, TOGETHER WITH THE APPARATUS EMPLOYED THEREIN FOR THE PURPOSE OF HEATING THE AIR PREVIOUS TO ENTERING THE FURNACE OR FURNACES, & FOR CONSUMING THE SMOKE, AND THE**  
10 **SAVING OF FUEL,**” to be as follows:—

My Invention consists of two or more furnaces, with two or more flues to each furnace, one of which flues being for the purpose of conveying the air from the front of the boiler, or building, or other more convenient part to a retort or receiver, comprising two or more separate chambers or copartments, according  
15 to the number of furnaces in use, which I propose to place in such a situation & so constructed, that the air being made to pass through it becomes heated to a high temperature, and then, conveyed from behind or otherwise by means of an under flue into the ash-pit (which is closed), passes up between the furnace bars and through the fire, and then proceeds through the other or  
20 ordinary flue or flues towards the chimney or funnel, enveloping the retort in



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*Napier's Impts. in the Construction of Furnaces for Marine & other Boilers, &c.*

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its passage by means of an outer case, for the purpose of receiving and using the spent heat on its passage to the chimney stalk or funnel.

In the other or ordinary flue or flues of the furnace, which adjoin the air flue, is placed at some convenient spot a damper or valve, so constructed as to open and shut a passage or communication between the said air flue and the ordinary flue or flues, before mentioned, during the process of firing; this damper or valve being intended to be opened simultaneously with the furnace door when required for the purpose of coaling, while a damper or valve placed at the mouth or other convenient part of the air flue becomes at same time partly or wholly shut, thereby causing the whole smoke and gasses from the newly-fired furnace (first having passed through the ordinary flue or flues) to enter the air flue, then through the retort, and from thence, by means of an under flue, into the ash-pit or ash-pits (which is or are closed) of the other furnace or furnaces, passes up between the furnace bars, and through the fire, and then proceeds through the ordinary flue or flues towards the chimney or funnel, enveloping the retort, and pursuing the same course as the heated air before mentioned, which last air damper or valve is also made to *shut* simultaneously with the *opening* of the flue valve by means of a balance pulley or other contrivance connecting the one with the other. The same process is followed and acted upon alternately in coaling the other furnace or furnaces by similar valves and apparatus made applicable to each. The valve of communication between the flues before mentioned is intended to continue open so long as there remains any smoke unconsumed.

In addition to the usual double furnace doors, I propose to have a perforated damper or outer door, between which & the said doors there is to be a narrow space, to allow a current of air to descend through an opening in the dead plate or in front of it to the ash-pit, in furtherance of the object above described, as well as serving as a protection to the stokers from the radiation of heat outwards. The ash-pit is to be completely closed in front by a door, to be opened only when necessary to remove the ashes. The said retort and outer case may be made of iron, brick, or other material.

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Printers to the Queen's most Excellent Majesty. 1856.